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10/574,142	03/29/2006	Gerardus P. Karman	2003P00715WOUS	8679

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EXAMINER

SPAR, ILANA L

ART UNIT	PAPER NUMBER
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2629

NOTIFICATION DATE	DELIVERY MODE
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01/06/2012

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

vera.kublanov@philips.com
debbie.henn@philips.com
marianne.fox@philips.com

Office Action Summary	Application No.	Applicant(s)	
	10/574,142	KARMAN ET AL.	
	Examiner	Art Unit	
	ILANA SPAR	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 December 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) ☒ Claim(s) 29-54 is/are pending in the application.
- 5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 29-54 is/are rejected.
- 8) ☐ Claim(s) ____ is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Response to Amendment

1. The following Office Action is responsive to the amendments and remarks received on December 6, 2011.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 29, 30, 33, 36, 39, 41-46, and 49-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marz et al. (US Patent No. 6,593,904) in view of Ueda et al. (US Patent No. 7,508,385).

With reference to claim 29, Marz et al. teaches a display device, comprising:
a display panel (30) having a plurality of separately addressable pixels for displaying a three dimensional image, the three dimensional image being comprised of a plurality of different views, each view displaying a different image from the other

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views, each view corresponding to one of a plurality of different first viewing angles with respect to a first axis, the pixels being grouped into a plurality of groups, a number of pixels in each group corresponding to a number of the different views, each pixel of each group corresponding to one of the plurality of different views of the three dimensional image, wherein all the pixels in the plurality of groups corresponding to one of the views display the different image of the one of the views (see column 6, lines 26-41 – each of the groups comprises two pixels in a single row, with the left pixel of the group corresponding to image 45 and the right pixel corresponding to image 46, which are two different views of the overall three dimensional image);

a display driver (18) for controlling an optical characteristic of each pixel to generate a grey scale image according to received image data (see column 5, lines 9-15); and

a grey scale compensation device (28) for optimizing grey scale rendering by compensating for a predetermined viewing angle dependency, wherein a correction applied to each of the plurality of pixels within the group is different (see column 5, lines 28-53).

Marz et al. fails to teach a grey scale compensation device for optimizing grey scale rendering by compensating for a predetermined viewing angle dependency by compensating for variations in slope of the different transmission-voltage (T-V) characteristics of each viewing angle such that a grey scale displayed by said plurality of pixel groups is independent of the viewing angle, wherein a correction applied to each of the plurality of pixels within the group is different.

Ueda et al. teaches a grey scale compensation device for optimizing grey scale rendering by compensating for a predetermined viewing angle dependency by compensating for variations in slope of the different transmission-voltage (T-V) characteristics of each viewing angle such that a grey scale displayed by said plurality of pixel groups is independent of the viewing angle, wherein a correction applied to each of the plurality of pixels within the group is different (see column 7, line 63 to column 8, line 3, column 8, lines 32-65, and column 9, line 19 to column 10, line 44 – Example 1-1 shows how the modified grey levels compensate for variations in slope, and Ueda also shows in column 8 how the voltage can be adjusted, or the duty ratio can be adjusted, or both, to provide a more regulated T-V characteristic slope that is not dependent on viewing angle), and

wherein said compensation comprises using a different range of driving voltages for each pixel in a pixel group such that the T-V characteristic for each pixel in the group is closely matched (see column 3, lines 48-50, column 7, line 63 to column 8, line 3, and column 8, lines 32-65).

It would have been obvious to one of ordinary skill in the art at the time of invention that the problem of viewing angle discrepancy identified by Ueda is common to all liquid crystal displays, such that it would be advantageous to incorporate the T-V correction method of Ueda into the display as taught by Marz, or any other liquid crystal display having viewing angle limitations, to ensure that the three-dimensional image being displayed at various viewing angles by Marz has the same grey level at all angles and does not have any color shift or contrast reversal.

With reference to claim 30, Marz et al. and Ueda et al. teach all that is required with reference to claim 29, and Marz et al. further teaches a back panel for providing a plurality of discrete sources of illumination, each group of pixels in the display panel being positioned to receive light from a respective one of the discrete sources of illumination (see column 4, lines 25-29).

With reference to claim 33, Marz et al. and Ueda et al. teach all that is required with reference to claim 30, and Marz et al. further teaches that the display panel is a light-transmissive display panel adapted for viewing from a side opposite to the side on which the back panel is located (see column 4, lines 8-12).

With reference to claim 36, Marz et al. and Ueda et al. teach all that is required with reference to claim 29, and Marz et al. further teaches that the display driver and grey scale compensation device in combination are adapted to control the amount of light passing through each pixel according to a grey scale image to be displayed (see column 5, lines 28-53 and column 6, lines 26-41).

With reference to claim 39, Marz et al. and Ueda et al. teach all that is required with reference to claim 29, and Marz et al. further teaches that the correction values are selected so as to substantially normalise a grey scale intensity displayed by a group of pixels to be independent of viewing angle (see column 5, lines 28-53).

With reference to claim 41, Marz et al. and Ueda et al. teach all that is required with reference to claim 29, and Marz et al. further teaches that the grey scale compensation device comprises a transmission versus voltage characteristic, and the

grey scale compensation device is adapted to adjust a pixel drive voltage and/or current received from the display driver (see column 5, lines 28-53).

With reference to claim 42, Marz et al. and Ueda et al. teach all that is required with reference to claim 29, and Marz et al. further teaches that the grey scale compensation device provides a voltage and/or current offset to the pixel drive voltage and/or current received from the display driver (see column 5, lines 28-53).

With reference to claim 43, Marz et al. and Ueda et al. teach all that is required with reference to claim 29, and Marz et al. further teaches that inherent optical characteristics of the display panel are configured such that viewing angle dependence is reduced or substantially minimized relative to the first axis which is a y-axis (see column 5, lines 28-53 and column 6, lines 26-41).

With reference to claim 44, Marz et al. and Ueda et al. teach all that is required with reference to claim 43, and Marz et al. further teaches that the grey scale compensation device serves to reduce or substantially minimize viewing angle dependence relative to the second axis which is an x-axis, wherein the second axis is orthogonal to the y-axis (see column 5, lines 28-53 and column 6, lines 26-41).

With reference to claim 45, Marz et al. and Ueda et al. teach all that is required with reference to claim 44, and Marz et al. teaches, further incorporated into an object, in which the x-axis is defined as the horizontal axis when the object is in normal use, and the y-axis is defined as the vertical axis when the object is in normal use (see column 5, lines 28-53 and column 6, lines 26-41).

With reference to claim 46, Marz et al. teaches a method for displaying a three dimensional image on a display device, the three dimensional image being comprised of a plurality of different views, each view displaying a different image from the other views, each view corresponding to one of a plurality of different viewing angles, the method comprising the steps of:

processing image data to form pixel data values for each one of a plurality of separately addressable pixels in a display panel, the pixels being grouped into a plurality of groups, a number of pixels in each group corresponding to a number of the different views, each pixel of each group corresponding to one of the plurality of different views of the three dimensional image, wherein all the pixels in the plurality of groups corresponding to one of the views display the different image of the one of the views as a function of an angle with respect to a first axis, the pixel data values each for controlling light transmission characteristics of a respective pixel to generate the different image (see column 6, lines 26-41 – each of the groups comprises two pixels in a single row, with the left pixel of the group corresponding to image 45 and the right pixel corresponding to image 46, which are two different views of the overall three dimensional image);

applying grey scale correction values to a plurality of pixel data values within each group to optimize grey scale rendering by compensating for a predetermined viewing angle dependency and for compensating for an optical characteristic of each pixel in a second axis of the display panel, wherein the second axis is transverse to the first axis, by controlling an amount passing through each pixel according to a three

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dimensional grey scale image to be displayed, wherein the grey scale correction values applied to each of the plurality of pixels within the group are different (see column 5, lines 28-53); and

using the corrected pixel data values to drive pixels of a display panel to generate said image (see column 5, lines 28-53), and

wherein the number of pixels in a group determine an angular resolution of each of the views (see column 6, lines 26-41 – each of the groups comprises two pixels in a single row, with the left pixel of the group corresponding to image 45 and the right pixel corresponding to image 46, which are two different views of the overall three dimensional image).

Marz et al. fails to teach applying grey scale correction values to a plurality of pixel data within each group to optimize grey scale rendering by compensating for a predetermined viewing angle dependency by compensating for variations in slope of the different transmission-voltage (T-V) characteristics of each viewing angle such that a grey scale displayed by the plurality of pixel groups is independent of the viewing angle.

Ueda et al. teaches applying grey scale correction values to a plurality of pixel data within each group to optimize grey scale rendering by compensating for a predetermined viewing angle dependency by compensating for variations in slope of the different transmission-voltage (T-V) characteristics of each viewing angle such that a grey scale displayed by the plurality of pixel groups is independent of the viewing angle (see column 7, line 63 to column 8, line 3, column 8, lines 32-65, and column 9, line 19 to column 10, line 44 – Example 1-1 shows how the modified grey levels compensate

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for variations in slope, and Ueda also shows in column 8 how the voltage can be adjusted, or the duty ratio can be adjusted, or both, to provide a more regulated T-V characteristic slope that is not dependent on viewing angle); and

wherein said compensation comprises using a different range of driving voltages for each pixel in a pixel group such that the T-V characteristic for each pixel in the group is closely matched (see column 3, lines 48-50, column 7, line 63 to column 8, line 3, and column 8, lines 32-65).

It would have been obvious to one of ordinary skill in the art at the time of invention that the problem of viewing angle discrepancy identified by Ueda is common to all liquid crystal displays, such that it would be advantageous to incorporate the T-V correction method of Ueda into the display as taught by Marz, or any other liquid crystal display having viewing angle limitations, to ensure that the three-dimensional image being displayed at various viewing angles by Marz has the same grey level at all angles and does not have any color shift or contrast reversal.

With reference to claim 50, Marz et al. and Ueda et al. teach all that is required with reference to claim 46, and Marz et al. further teaches that the grey scale correction values are derived from a transmission versus voltage characteristic of the display panel, the corrected pixel data values being used to adjust a pixel drive voltage and/or current applied to the display panel (see column 5, lines 28-53).

With reference to claim 51, Marz et al. and Ueda et al. teach all that is required with reference to claim 46, and Marz et al. further teaches the step of configuring the inherent optical characteristics of the display panel such that viewing angle dependence

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is reduced or substantially minimized relative to the first axis which is a y-axis (see column 5, lines 28-53 and column 6, lines 26-41).

With reference to claim 52, Marz et al. and Ueda et al. teach all that is required with reference to claim 46, and Marz et al. further teaches that the grey scale correction values are applied to reduce or substantially minimize viewing angle dependence relative to the second axis which is an x-axis, wherein the second axis is orthogonal to the y-axis (see column 5, lines 28-53 and column 6, lines 26-41).

With reference to claim 53, Marz et al. and Ueda et al. teach all that is required with reference to claim 52, and Marz et al. further teaches that the x-axis is the horizontal axis when the display panel is in normal use, and the y-axis is the vertical axis when the display panel is in normal use (see column 5, lines 28-53 and column 6, lines 26-41).

With reference to claim 54, Marz et al. and Ueda et al. teach all that is required with reference to claim 46, and Marz et al. further teaches that the method is executed by a computer (see column 5, lines 9-26 - it is inherently known that display panels are driven using computers which control the driving functions of the display).

5. Claims 31, 32, 37, 38, 40, and 47-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marz et al. in view of Ueda et al. as applied to claims 29 and 46 above, and further in view of Gelsey (US Patent No. 6,344,837).

With reference to claim 31, Marz et al. and Ueda et al. teach all that is required with reference to claim 30, but fail to teach line sources of illumination.

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Gelsey teaches a three dimensional display having a plurality of line sources of illumination (see column 4, lines 21-29 and column 6, lines 60-65).

It would have been obvious to one of ordinary skill in the art at the time of invention that any type of backlight can be used to illuminate the three dimensional display pixels, as is well-known and commonly used in the art.

With reference to claim 32, Marz et al. and Ueda et al. teach all that is required with reference to claim 30, but fail to teach point sources of illumination.

Gelsey teaches a three dimensional display having a plurality of point sources of illumination (see column 4, lines 21-29).

It would have been obvious to one of ordinary skill in the art at the time of invention that any type of backlight can be used to illuminate the three dimensional display pixels, as is well-known and commonly used in the art.

With reference to claim 37, Marz et al. and Ueda et al. teach all that is required with reference to claim 29, but fail to teach a look-up table.

Gelsey teaches that the grey scale compensation device comprises a look-up table containing correction values to be applied in respect of each pixel within a group (see column 10, lines 2-4).

It would have been obvious to one of ordinary skill in the art at the time of invention to use a look-up table rather than carry out all necessary computations at the time of image display in order to reduce processing demands and lag time on the system.

With reference to claim 38, Marz et al., Ueda et al., and Gelsey teach all that is required with reference to claim 37, and Marz et al. further teaches that the correction values are selected according to a viewing angle of a respective pixel within a group (see column 5, lines 28-53).

With reference to claim 40, Marz et al., Ueda et al., and Gelsey teach all that is required with reference to claim 37, and Gelsey further teaches that the look-up table includes substitution values or offset values as a function of viewing angle to be applied to a frame store (see column 9, line 15 to column 10, line 4).

With reference to claim 47, Marz et al. and Ueda et al. teach all that is required with reference to claim 46, but fail to teach a look-up table.

Gelsey teaches that the grey scale correction values are obtained from a look-up table containing correction values to be applied in respect of each pixel within a group (see column 10, lines 2-4).

It would have been obvious to one of ordinary skill in the art at the time of invention to use a look-up table rather than carry out all necessary computations at the time of image display in order to reduce processing demands and lag time on the system.

With reference to claim 48, Marz et al., Ueda et al., and Gelsey teach all that is required with reference to claim 46, and Marz et al. further teaches that the grey scale correction values are selected according to a viewing angle of a respective pixel within a group (see column 5, lines 28-53).

With reference to claim 49, Marz et al., Ueda et al., and Gelsey teach all that is required with reference to claim 48, and Marz et al. further teaches that the grey scale correction values are selected so as to substantially normalise a grey scale displayed by a group of pixels to be independent of the viewing angle (see column 5, lines 28-53).

6. Claims 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marz et al. in view of Ueda et al. as applied to claim 29 above, and further in view of Balogh (US Patent Publication No. 2001/0028356).

With reference to claim 34, Marz et al. and Ueda et al. teach all that is required with reference to claim 29, but fail to teach a lenticular array.

Balogh teaches a lenticular array (20) positioned adjacent to the display panel, each lenticle within the lenticular array focusing light from selected pixels in the display panel (see paragraph 36).

It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate a lenticular array into the device as taught by Marz et al. to focus the light emerging from each pixel and ensure that it is directed toward the particular viewing angle to ensure that the three dimensional image is viewed properly.

With reference to claim 35, Marz et al., Ueda et al., and Balogh teach all that is required with reference to claim 34, and Balogh further teaches that each lenticle within the lenticular array is associated with a group of pixels (see paragraph 37).

Response to Arguments

7. Applicant's arguments with respect to claims 29-54 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ILANA SPAR whose telephone number is (571)270-7537. The examiner can normally be reached on Monday-Thursday 8:00-4:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bipin Shalwala can be reached on (571)272-7681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ILS

/Bipin Shalwala/
Supervisory Patent Examiner, Art Unit 2629